Overview
The latest Intel® Atom™ processor family includes integrated, enhanced graphics and memory controllers on 45nm process technology, delivering significant power reduction, performance improvements and smaller platform footprint over the previous Intel® Atom™ processor N270. This family includes the dual-core Intel® Atom™ processor D510 and single-core Intel® Atom™ processors N450 and D410.

This platform includes the Intel® 82801HM I/O Controller, providing an Intel® High Definition Audio interface, along with rich I/O capabilities and flexibility via high-bandwidth interfaces such as PCI Express, PCI, Serial ATA, and Hi-Speed USB 2.0 connectivity. Intel® Embedded Flexible Design saves time and money by allowing developers to design and/or manufacture a single board that can then be populated with any of the three processors, with minimal changes.

Featuring extended lifecycle support, these processors offer an excellent solution for embedded market segments such as print imaging, digital signage, retail and transaction solutions (point-of-sale, ATMs, kiosks, transaction terminals), thin clients, digital security, residential gateways, commercial and industrial control. The processors remain software compatible with previous 32-bit Intel® architecture and complementary silicon.

Product Highlights
- Intel® Embedded Flexible Design enables scalability for the first time on the Intel Atom processor, with minor BOM stuffing options.
- Integrated graphics and memory controllers, built directly into the processor die, support lower power and smaller footprint for small form factor designs.
- Memory support for DDR2 667 MHz with up to 2 GB addressability for improved system responsiveness.
- Integrated Intel® Graphics Media Accelerator 3150 supports LVDS and VGA ports for multiple connectivity options.
- Dual cores deliver full parallel execution of multiple software threads, enabling higher levels of performance. (D510 only).
- Intel® Streaming SIMD Extensions (SSE) 2 and Intel® SSE3 enable software to accelerate data processing in specific areas, such as complex arithmetic and video decoding.
- Enhanced Intel® Deeper Sleep (C4/C4E) reduces power consumption by flushing cache data to system memory during periods of inactivity and forcibly reducing the performance state of the processor when entering a low-power state (N450 only).
- Intel's hafnium-based 45nm Hi-k metal gate silicon process technology reduces power consumption, increases switching speed, and significantly increases transistor density over previous 65nm technology.
• Intel® Hyper-Threading Technology\(^2\) (two threads) provides high performance-per-watt efficiency in an in-order pipeline, and increased system responsiveness in multi-tasking environments. One execution core is seen as two logical processors, and parallel threads are executed on a single core with shared resources.

• Dynamic L2 cache sizing reduces leakage due to transistor sleep mode.

• Execute Disable Bit\(^3\) prevents certain classes of malicious “buffer overflow” attacks.

• Embedded lifecycle support protects system investment by enabling extended product availability for embedded customers.

• Along with a strong ecosystem of hardware and software vendors, including members of the Intel® Embedded Alliance (intel.com/go/eca), Intel helps to cost-effectively meet development challenges and speed time-to-market.
Software Overview
The following independent operating system and BIOS vendors provide support for these platforms.

**OPERATING SYSTEM** | **CONTACT** | **BIOS**
--- | --- | ---
Microsoft Windows* XP SP3 | Intel provides drivers⁴ | American Megatrends
Microsoft Windows Embedded Standard (XPe) SP3 | Intel provides drivers⁴ | Insyde Software
Microsoft Windows Embedded Point of Sale (WEPOS) | Intel provides drivers⁴ | Phoenix Technologies
Microsoft Windows Embedded CE 6.0 R2 | Adeneo, BSQUARE, WiPro
Fedora Linux* | Fedora Community
MontaVista Linux | MontaVista
Wind River VxWorks* | Wind River
SUSE Linux Enterprise 10 | Novell

**Intel® Atom™ Processors for Embedded Computing**

<table>
<thead>
<tr>
<th>PROCESSOR⁴</th>
<th>PRODUCT NUMBER</th>
<th>CORES</th>
<th>CORE SPEED</th>
<th>L2 CACHE</th>
<th>GRAPHICS SPEED</th>
<th>C-STATES SUPPORTED</th>
<th>THERMAL DESIGN POWER⁵</th>
<th>TJUNCTION</th>
<th>PACKAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>N450</td>
<td>AU80586GE025D</td>
<td>1</td>
<td>1.66 GHz</td>
<td>On-die 512 KB, B-way</td>
<td>200 MHz</td>
<td>CO – C4</td>
<td>5.5 W</td>
<td>0 to 100° C</td>
<td>559-ball lead-free FCBGA 22 mm x 22 mm</td>
</tr>
<tr>
<td>D410</td>
<td>AU80610004671AA</td>
<td>1</td>
<td>1.66 GHz</td>
<td>On-die 512 KB, B-way</td>
<td>400 MHz</td>
<td>CO – C1</td>
<td>10 W</td>
<td>0 to 100° C</td>
<td>559-ball lead-free FCBGA 22 mm x 22 mm</td>
</tr>
<tr>
<td>D510</td>
<td>AU80610004392AA</td>
<td>2</td>
<td>1.66 GHz</td>
<td>On-die 2x 512 KB, B-way</td>
<td>400 MHz</td>
<td>CO – C1</td>
<td>13 W</td>
<td>0 to 100° C</td>
<td>559-ball lead-free FCBGA 22 mm x 22 mm</td>
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</table>

**Intel® 82801HM I/O Controller for Embedded Computing**

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>PRODUCT CODE</th>
<th>THERMAL DESIGN POWER</th>
<th>PACKAGE</th>
<th>FEATURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel® 82801HM I/O Controller</td>
<td>NIB82801HBM</td>
<td>2.4 W</td>
<td>TBGA676</td>
<td>Six PCI Express®, PCI, Serial ATA, and Hi-Speed USB 2.0 connectivity; Intel® High Definition Audio® interface.</td>
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